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TIME-SENSITIVE TERMINATION:  
'PROMPT GLOBAL STRIKE' IN THE WAR ON TERROR



by

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# Contents

Figures .....	iv
Acknowledgements.....	v
Abstract.....	vi
Section 1: Introduction.....	1
Section 2: Background.....	6
<i>Time Sensitive Targeting</i> .....	6
<i>Prompt Global Strike</i> .....	9
<i>Round 1: The Conventional Trident Missile</i> .....	10
<i>Round 2: Conventional Strike Missile</i> .....	11
Section 3: Evaluation Criteria.....	15
<i>Recent Acquisition Program Issues and Criteria Developed for Evaluation</i> .....	15
<i>Program Specific Obstacles</i> .....	17
<i>General Issues and Derived Evaluation Criteria</i> .....	18
Section 4: Analysis .....	20
<i>Summary of the Analysis</i> .....	20
<i>CSM Performance Against the Criteria</i> .....	21
<i>Analysis Summary</i> .....	24
Section 5: Future of the CSM .....	25
<i>System Utility in Ongoing Conflicts</i> .....	25
<i>Long Term Prospects</i> .....	25
<i>Conclusion: To CSM or not to CSM</i> .....	26
Glossary .....	27
Endnotes.....	28
Bibliography .....	31

## Figures

1. Launch of a Trident II Submarine Launched Ballistic Missile (SLBM).....	9
2. Sample Mission Profile.....	12
3. Potential Warhead External Configuration.....	13
4. Evaluation Criteria versus CTM and CSM.....	21



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## **Abstract**

The Conventional Strike Missile (CSM), designed to strike fleeting high value targets anywhere on the globe in less than an hour, faces an uncertain future. In the current fiscal environment, programs unable to demonstrate an immediate or near term impact in the ongoing conflicts against al Qaeda and the Taliban in Afghanistan and Pakistan face significant reductions or outright cancellation. This research paper evaluates the CSM against several criteria derived from issues which have resulted in the cancellation of other programs, using the CSM's predecessor, the Conventional Trident Missile (CTM), as a baseline for comparison. This paper finds that while the CSM performs remarkably better against the criteria in relation to the CTM, it still fails to demonstrate a near term relevance in the ongoing conflicts as well as significant international opposition to its deployment and use. While the system may not demonstrate significant utility in the near-term War on Terror, given the longer term potential of the CSM and follow-on systems, this paper recommends continued development and employment of the Conventional Strike Missile.

## Section 1: Introduction

*—If our forces can't be in position to respond rapidly, it is prudent to have the ability to defeat attacks or eliminate high value or fleeting targets at global ranges rather than suffer the consequences of an attack.*  
GENERAL JAMES CARTRIGHT, COMMANDER, UNITED STATES STRATEGIC COMMAND, Mar 2007

In the modern era of warfare, the large massed troop formations witnessed in earlier eras have largely given way to small groups or even individuals striking from hiding and fading away before a response can be mounted. These groups frequently use civilians as human shields, hiding their operations in buildings filled with non-combatants. When they do emerge from hiding to strike, there is little warning, giving war fighters only minutes or hours to address the threat. This ability to appear, strike a target, and disappear in short periods of time provides planners almost no time to properly conduct the necessary steps of the targeting process and reach the “engage” step, the fifth step of the Find, Fix, Track, Target, Engage, Assess (F2T2EA) cycle as defined by *Joint Publication 3-60: Targeting*.<sup>1</sup> While planners from the U.S. Air Force’s theater air planning and coordination cells, known as “Air Operations Centers” (AOC), have devised new ways to accelerate the targeting process, the ability to strike those emerging targets has failed to keep pace. For example, a 2007 study conducted by the National Academy of Sciences concluded that lack of a rapid strike capability allowed Osama bin Laden and other al Qaeda leadership to repeatedly escape capture or death.<sup>2</sup> If no friendly combat forces are available in the immediate area to engage the emerging threat, the fleeting targets usually live to fight another day.

The inability to strike fleeting high value targets is a problem that began increasing in significance as far back as 1996, in large part due to the increased terrorist “hit and run” tactics around the world. With the attacks of September 11, 2001 and the emergence of al Qaeda as the

primary US adversary, the importance of acquiring a capability to engage fleeting targets reached an all time high. If a high value terrorist target emerges from hiding to either plan or conduct a mass casualty attack, the military should be equipped with a system that can interdict the target and potentially prevent the attack.

In the movie *Stealth*, Hollywood depicts the solution as carrier-launched hypersonic fighters crossing the globe in mere minutes, striking their targets with impunity, and then returning to their respective bases in the same day.<sup>3</sup> While this is nowhere near feasible given the state of technology, the United States has embarked on an effort to field both near and long term solutions to the problem of rapidly destroying fleeting targets halfway around the world when forces are not forward deployed in the vicinity of the target area. Enter the Prompt Global Strike (PGS) program.

Prompt Global Strike is the overarching military acquisition program to provide the capability to strike military targets anywhere on the globe within an hour from the order being given to strike, in support of US Strategic Command's (USSTRATCOM) global strike mission requirements.<sup>4</sup> To fulfill the PGS requirement, the Department of Defense (DOD) developed two systems—the first: the (now cancelled) submarine launched Conventional Trident Missile (CTM), which replaces the standard Trident's nuclear warheads with conventionally armed versions on patrolling strategic deterrent platforms; and the second: the Air Force Space Command (AFSPC) developed ground-launched Conventional Strike Missile (CSM), which utilizes existing commercial or surplus military boosters to create a launch platform for a conventionally armed hypersonic warhead. The CTM and CSM are near-term solutions within the overarching PGS acquisition program, designed to eliminate the gap in our rapid global strike capabilities as soon as possible while DOD defines the long-term PGS solution. The PGS



program endeavors to field the near term capability not later than 2015, with an initial fielding objective potentially as early as 2012.<sup>5</sup> The program will initially leverage existing systems where possible to accelerate development, focusing development efforts on the payload portion of the system. The fielded system will be tailored to minimize collateral damage in the target area, even when projected across global distances. Additionally, though the system will initially employ a heritage ballistic delivery method, it must not increase the risk of a nuclear exchange caused by misinterpretation by a foreign country.

Prompt Global Strike's current program of record, the specific system in development to fill the gap in military capabilities, is the Air Force's Conventional Strike Missile; a land based conventionally armed long range ballistic missile launched from coastal bases. Following the 2009 termination of the Navy's controversial Conventional Trident Missile program, a conventional missile designed for launch from patrolling ballistic missile submarines, the CSM took center stage in the effort to field a near-term solution to the problem.

The CSM weapon system, however, is not without opposition. Given the current political, technological, and funding climates, programs deemed ineffective or useless in the current War on Terror face significant cuts or even outright cancellation. Funding shortfalls are even reducing the scope of programs that are contributing to the fight, and international and Congressional pressures are delaying or limiting some near term systems already in the research and development process. The CSM weapon system itself faces technological issues that may force test flights further into the future.<sup>6</sup>

In this environment, acquisition professionals and budget programmers need to answer one key question. With US combat troops expected to depart Iraq by 2011<sup>7</sup>—one year before the first full CSM flight test—can the Conventional Strike Missile play a role in the Global War on

Terror (GWOT)<sup>8</sup>, specifically in Afghanistan and Pakistan?<sup>9</sup> This paper seeks an answer to this question.

This paper maintains that the Conventional Strike Missile will not likely affect the near term War on Terror in Afghanistan or Pakistan. Political, technological, and funding hurdles faced by the Department of Defense in recent years including Congressionally mandated changes to certain programs at the expense of other acquisitions; programs with insufficiently mature technologies causing significant delays; and significant budgetary shortfalls have set the foundation by which all existing and future defense acquisition programs are measured. Additionally, international opposition plays a large role in the current environment, as the U.S. seeks to rebuild the alliances and partnerships affected by the GWOT and related actions.

The United States has not successfully convinced its allies and potential adversaries of the program's limited focus; specifically that of targeting fleeting high value targets preparing to conduct weapon of mass destruction strikes against the United States and its allies. Resultantly, many foreign nations do not trust the publicly stated goals of the CSM program. Many opponents of the program claim that its employment will at best ruin US international relations for years, and at worst could cause the outbreak of nuclear war. Should the system reach the deployment stage in its current form, it will likely form a very potent weapon system that fulfills more of a deterrent role than a useful means to destroy distant targets. The risks inherent in a ballistic delivery method as well as targeting over global distances will likely limit the Commander in Chief's ability to effectively employ the weapon.

This research effort uses an evaluation style framework in addressing the question. This framework details the imperative driving the need for Prompt Global Strike, specifically that of Time Sensitive Targeting (TST). A review of key failures to strike fleeting targets demonstrates

how the need for improvement of current TST methods led to the Prompt Global Strike effort, and highlights the evolution of the PGS program to date. The paper then evaluates the current program, the Conventional Strike Missile, specifically assessing the health of and the obstacles facing the program in the past, present, and future. Armed with this analysis, the paper evaluates the planned future of the CSM weapon system and its application to ongoing engagements in the War on Terror. This paper also looks at the post-CSM methods of meeting the PGS objectives and makes a recommendation whether to proceed with the Conventional Strike Missile program in its current form.



## Section 2: Background

*-It is unlikely that we will have forces in every place we need them at the crucial moment when have an opportunity to stop a WMD-armed threat far from our shores.*

GENERAL JAMES CARTRIGHT, COMMANDER, UNITED STATES STRATEGIC COMMAND

Any review of the Prompt Global Strike program must include that which enables its potential success—effective time sensitive targeting. Without an effective Time Sensitive Targeting (TST) process, the ability to strike fleeting targets around which the PGS program is heavily focused would be largely impossible. This section provides background of both the TST process and the Prompt Global Strike program.

### *Time Sensitive Targeting*

Time sensitive targeting owes its modern day origins to the experiences of the first Gulf War, Operation Desert Storm. The United States and its coalition partners sought methods to strike emerging targets, in particular critical leadership nodes and the mobile ballistic missiles commonly referred to by their North Atlantic Treaty Organization (NATO) reporting name, SS-1 SCUD. Despite a significant effort involving over 2500 sorties and 1500 strikes, no mobile SCUDs were struck.<sup>10</sup> Even with assets in theater, it proved impossible to find and engage the SCUD transporter-erector-launchers (TEL) before they stowed their equipment and departed to pre-selected areas of concealment. This was largely due to the ad-hoc nature of the dynamic targeting process in use at the time. The Operation Infinite Reach<sup>11</sup> cruise missile strikes into Afghanistan and Sudan and the air campaign against Iraq during Operation Desert Fox<sup>12</sup> during 1998 highlighted our inability to engage high value non-static targets. By the time of Operation Allied Force (OAF), many of the TST issues encountered during Desert Storm remained. A similar ad-hoc process was implemented until a coordinated process could be established.

To combat the time required for an aircraft to transit to the target area, some TST dedicated assets assumed an orbit near potential areas of interest, accompanied by a refueling tanker to increase endurance.<sup>13</sup> While this shortened response time, it took assets away from the overall Air Tasking Order (ATO). Another method utilized was to “re-target” sorties already in progress. While more efficient than the airborne standby option, this method forced planners to re-plan the diverted sortie or shift aircraft in a virtual “domino effect.” As Operation Enduring Freedom (OEF) commenced, a coordinated joint process remained in the draft stage. As a result, TST efforts remained largely centralized, causing unnecessary delays as some targets required Secretary of Defense (SecDef) approval prior to being struck. By the end of OEF’s first five months, a process began to emerge that would directly impact TST efforts in Operation Iraqi Freedom (OIF).<sup>14</sup> OIF saw the implementation of an innovative new process to engage time sensitive targets. From the start of planning, the Combined Air Operations Center (CAOC) included a dedicated TST cell to prosecute emerging targets. The theater of operations was separated into three sectors, each of which maintained a different focus; for example SCUD hunting dominated the western sector.<sup>15</sup> Perhaps the most important change was the use of coordinated target definitions throughout the theater. This allowed for effective prioritization of target types versus available assets, increasing the effectiveness of cross sector coordination when required.

Some of the best known TST strikes to date occurred during Operation Iraqi Freedom. The most notable success—the decapitation strike against Abu Musab al-Zarqawi—demonstrates the utility of the TST process when all of the necessary prerequisites are met. In this case, the prerequisites included available platforms such as F-16s loitering near the target area or retasked from other missions, unexpended precision laser or satellite guided munitions, and actionable

intelligence.<sup>16</sup> The Dora Farms decapitation strike is perhaps the most well known failure of the OIF TST process. On the night prior to the opening night of the war, a “reliable” tip found its way to the Central Intelligence Agency (CIA), indicating that Saddam Hussein and possibly his sons were sleeping at a location in the Dora Farms neighborhood.<sup>17</sup> Two F-117A stealth fighters being prepared for the start of the air war were quickly readied and sent to conduct the mission. Under radio silence they struck the target, departing the area just before daylight. While the fighters placed their bombs expertly on target, their quarry was nowhere nearby. The failure to strike Saddam was confirmed hours later when he addressed the Iraqi people on television decrying the attack. What went wrong? In this case, the platform and weapons were available, but the intelligence failed to carry the day<sup>18</sup>.

Though the current TST process can be effective within the confines of an active theater of operations, there are several potential limiting factors when a TST emerges outside of the area of responsibility (AOR). These factors are the availability of nearby combat assets (*speed*) and actionable information (*intelligence*). To strike a *fleeting* time sensitive target, speed is of the essence. The target may be reachable for only minutes, or could be strikeable for several hours. In the case of a short duration target, lack of immediately available force application such as aircraft overhead or nearby special operations forces will generally result in a failed opportunity as a global strike capability will not likely reach the target in time. For longer duration targets, a rapid global strike capability defined as less than one hour from detection to attack is essential to ensure success. In all cases, accurate actionable intelligence is an absolute must. Whether a target is struck by on-call airborne assets or by a missile or other weapon system half a world away, accurate intelligence can mean the difference between a successful strike and international condemnation.

## ***Prompt Global Strike***

Contrary to popular belief, the origins of Prompt Global Strike predate the events surrounding 11 September 2001. As far back as 1996, numerous research efforts addressed the feasibility of arming an intercontinental ballistic missile (ICBM) with conventional warheads<sup>19</sup>. An Air Force 2025 study was the first such study to propose conventional or other non-nuclear solutions on ground launched rockets for rapid target strikes.<sup>20</sup> In March of 1998, Air Force Space Command released its *Long Range Plan: Implementing USSPACECOM Vision for 2020*, wherein conventionally tipped ballistic missiles could strike adversary targets as early as 2005, building up to an aerospace operations vehicle in the 2012 timeframe.<sup>21</sup> February 1999 saw a Navy FY2000 budget proposal calling for development of “an advanced conventional earth penetrator warhead for use on conventional ballistic missiles.”<sup>22</sup> Other efforts emerged through early 2001, but were limited to research studies and needs statements without significant programmatic backing. It was not until the terrorist attacks on New York and Washington D.C. that the effort gained significant momentum.

Through the first half of this decade, DOD studied various PGS concepts, initiating the long term portion of the PGS architecture in 2003 with release of the FALCON Proposers Information Pamphlet.<sup>23</sup> The technological immaturity of the FALCON programs main element, hypersonic delivery vehicles, failed to fill the near term gap in rapid global strike capability. To fill the gap, both the U.S. Navy and Air Force (via Air Force Space Command) undertook studies on potential near term alternatives. While each service commenced development of a system to fill the need, the Navy’s Conventional Trident Missile became the DOD’s primary choice due to the likelihood of an earlier fielding date.

### *Round 1: The Conventional Trident Missile*

The Conventional Trident Missile (CTM) program endeavored to deploy modified Trident II submarine launched ballistic missiles (SLBM) aboard patrolling nuclear deterrent submarines. Each submarine would carry two conventionally armed missile modified to attain a 10 meter class accuracy at impact, in addition to twenty two nuclear armed versions.<sup>24</sup> The minimal modification required to field this system increased the likelihood of an earlier deployment, giving the President a new strategic option without resorting to nuclear weapons.<sup>25</sup> One variant would carry modified Mark IV reentry vehicles, designed to destroy targets by kinetic impact. This variant would reduce the likelihood of collateral damage, as it would not carry any explosive components. The second variant utilized a more conventional warhead, with high explosives propelling tungsten rods towards a target complex, potentially destroying targets within a 3000 square foot area.<sup>26</sup>



Figure 1. Launch of a Trident II SLBM<sup>27</sup>

Unfortunately, the characteristic that allowed for an early deployment of the CTM also proved to be its downfall. The need to deploy the systems alongside the traditional nuclear



armed SLBMs drew significant criticism from domestic and foreign sources. The PGS program is supposed to reduce the outbreak of nuclear war, but a conventionally armed Trident would appear the same as the nuclear armed version when launched. Russian President Vladimir Putin warned in 2006 that the launch of such a weapon would drastically increase the risk of a nuclear exchange.<sup>28</sup> Confidence building measures such as prior notification to peer competitor nations such as Russia and China are cited as problematic, noting the possibility that a peer competitor may notify the intended target, preventing a successful strike.

Opposition at both the international and congressional levels led to repeated funding cuts for the CTM, with the final program termination in 2009. Funding was deleted from the CTM program and transferred to the general defense account for Prompt Global Strike.<sup>29</sup> Along with the funding shift came direction to look at all potential PGS systems<sup>30</sup>, and shortly thereafter the Conventional Strike Missile was selected to replace the CTM as the DOD's desired weapons system to fill the PGS capability need.

### *Round 2: Conventional Strike Missile*

The Conventional Strike Missile effort is a two phase program. The first phase consists of a near term solution based on existing technology and utilizing heritage booster hardware. The second, longer term, phase seeks to deploy a potentially reusable hypersonic vehicle that can perform a variety of functions for the combatant commanders. This paper focuses on the near term effort to assess its utility in the near term War on Terror.

The AFSPC vision for the CSM as defined in its CSM Enabling Concept:

[The CSM acquisition program] includes development and operation of a highly responsive, CONUS-based delivery system providing global assured strike capability. CSM [will be] capable of providing an array of effects required by the AF-level CONOPS (i.e., Global Strike, Global Persistent Attack, and Homeland

Defense and Civil Support). This powerful, flexible system [will] provide capabilities for stand-off weapons employment, while overcoming the anti-access environment of the future. CSM will provide warfighters prompt, global-range attack and a viable strategic deterrent without the need for forward deployment of equipment and personnel to achieve desired effects.

Specifically, the CSM weapon system provides the following effects to the various Air Force CONOPS:

- (1) Access. Project force within an anti-access environment.
- (2) Rapid Global Response. The capability to quickly neutralize the adversary's key high-value targets (e.g., WMD, leadership) anytime, anywhere.
- (3) Freedom to Maneuver. Unhindered ability of Joint and coalition forces to attack targets at will or force the enemy into such a disadvantaged position that continued resistance is futile. Neutralize enemy combat effectiveness primarily through shock and disruption, rather than solely relying on annihilation and attrition.
- (4) Deterrence. A CSM capability may convince an adversary not to initiate hostile actions.<sup>31</sup>

The Global Strike CONOPS “pinpoints the means to ‘kick down the door’ and allow follow-on forces to operate. [The] CONOPS also includes capabilities needed to execute a rapid, global operation to prosecute a precise response to a hostile state-supported or terrorist action against the United States.”<sup>32</sup> Born out of a competition between the Air Force and Navy to develop the PGS program of record, early designs based the CSM on existing intercontinental ballistic missile boosters, namely the Minuteman III and/or Peacekeeper. With the direction to reduce the likelihood of a nuclear engagement resulting from the system's employment, the designs switched to using launch vehicles lacking an ICBM boost signature. The current version of the CSM utilizes a Minotaur IV booster, composed of a Peacekeeper first stage and space launch vehicle upper stages for the initial test launches. The final system will likely comprise a new booster based on existing non-nuclear heritage systems.<sup>33</sup>

Another departure from the ballistic ICBM signature comes from the payload section of the CSM. The payload will utilize a hypersonic vehicle to deliver its payload rapidly to the

target, dropping quickly out of a ballistic trajectory and assuming a flatter, less threatening flight path. This type of delivery system can potentially achieve speeds in excess of Mach 5, and is being developed using experience gained from the X-43A series of test launches. During these launches, the X-43A achieved a maximum velocity of Mach 9.68 (7,180 miles per hour).<sup>34</sup>

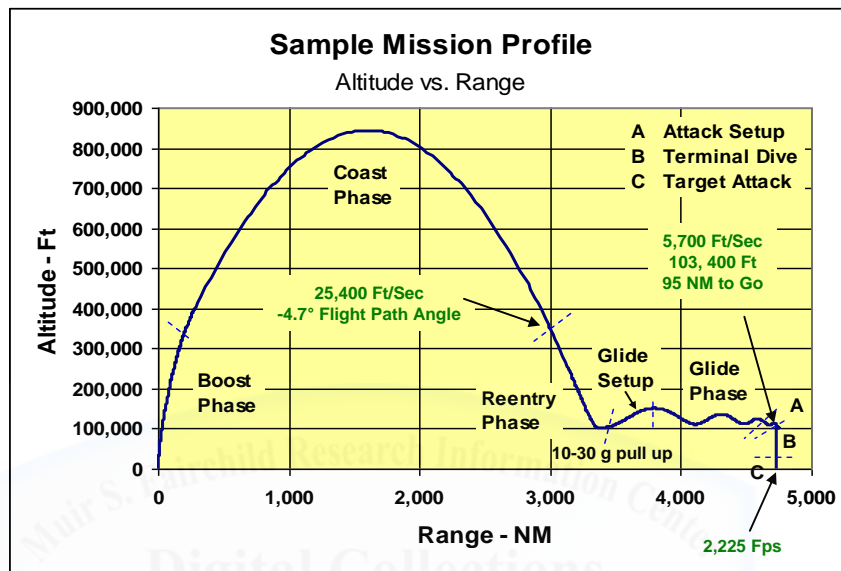


Figure 2: Sample Mission Profile<sup>35</sup>

To successfully accomplish the hypersonic portion of its flight, the CSM will employ state of the art hypersonic technology to develop a long range payload delivery system that can withstand the heating and stress rigors of the high-Mach flight regime. This payload will employ lifting body techniques to limit drag on the vehicle, increasing the potential range of the CSM weapon system. Contained within the hypersonic delivery “envelope” are a variety of potential payloads, ranging from kinetic penetrators to small diameter bombs and other guided weaponry.<sup>36</sup>



Figure 3: Potential Warhead External Configuration<sup>37</sup>

Another requirement to prevent an accidental nuclear exchange is the mandate to launch from a location not currently associated with operational nuclear delivery systems. The existing requirement to launch all non nuclear-alert missiles and space launch vehicles away from populated areas makes the desired location coastal, ideally using existing launch facilities at either Vandenberg or Patrick AFB. The current plan as indicated in the CSM Enabling Concept utilizes the TP-01 launch facility at Vandenberg AFB in California.<sup>38</sup>

### **Section 3: Evaluation Criteria**

To evaluate whether the CSM can play a role in the ongoing GWOT engagements in Afghanistan and Pakistan, it is necessary to assess the program against a variety of criteria. The six criteria examined in this evaluation include problems that have led to the cancellation or reduction of other recent acquisition programs, as well as some potential issues unique to a Prompt Global Strike weapon system. These criteria are valid measures of the CSM program's progress. Failure to meet one or more of the criteria could possibly lead to the program's delay, restructuring, or even termination. Issues that recently led to the cancellation or reduction of other programs include the system's utility in the current GWOT conflicts, instability in a program's development, testing, and production schedule, and cost growth of the overall program. Issues unique to a PGS weapons system include the political, international, technological, and fiscal obstacles inherent in a global strike weapon.

#### **Recent Acquisition Program Issues and Criteria Developed for Evaluation**

Several recent acquisition programs have endured changes or outright termination as a result of shrinking federal budgets and the arrival of new Presidential administrations. While each new administration brings a particular bias based on personal beliefs, political party affiliation, etc., a consistent set of standards is generally used to evaluate the future of programs under review. Evaluation of the standards employed to reach such decisions would therefore seem appropriate to use in evaluating the CSM.

Criterion 1: Relevance. Perhaps the most notable termination in recent history is the 2009 decision to end the F-22 Raptor program due to its lack of relevance in the GWOT. According to Secretary of Defense Robert M. Gates, the aircraft played no role in the conflict in Iraq<sup>39</sup> and has no peer competitors to justify a continued acquisition of further airframes. Several

other defense programs including the long sought after Future Combat System (FCS) family of armored vehicles faced termination for those same reasons. The first criterion, therefore, to apply against the Conventional Strike Missile is *whether it will be available and usable during the near term GWOT actions in Afghanistan and Pakistan.*

Criterion 2: Schedule Stability. Another programmatic issue that frequently causes program reductions or terminations is the ability to conform to approved acquisition schedules. While generally the result of other factors such as funding cuts or technological maturity, the ability to remain on schedule can make or break a promising acquisition program. Recent examples of programs reduced or cancelled at least in part due to poor schedule performance include the VH-71 Presidential helicopter and the Boeing Airborne Laser program.<sup>40</sup>

To determine a program's potential to meet its approved acquisition schedule, it is necessary to examine its schedule history. Schedule history is generally comprised of and can be evaluated against two major portions, the ability to keep to the original baseline and the effect of non-program induced delays. Several milestones within the original baseline include entering and completing testing as well as meeting the Initial and Final Operational Capability dates set forth early in a program's history. Induced delays include those caused by reshuffling defense budgets and Congressional directed changes to the existing program that cause ripple effects. The Congressional changes can result in an acceleration or deceleration of the program. Hence, a key criterion to evaluate the CSM within this area is *whether it has or can conform to its baseline schedule, and how it performs against delays induced by external causes.*

Criterion 3: Funding Stability. The last area by which many programs are measured and ultimately succeed or fail to complete is that of funding. Failure to conform to approved funding baselines can have a drastic impact on the future of a given acquisition program. A prime

example of this phenomenon is the Space Based Infrared System (SBIRS) constellation of satellites, which has repeatedly exceeded the authorized funding baseline, resulting in several Nunn-McCurdy Breach reports to Congress. A Nunn-McCurdy Breach report notifies Congress that an acquisition program has exceeded its approved per unit and overall program funding levels by at least 15 percent over the current baseline, or 25 percent over the original program baseline, and generally results in a reduction or at least restructuring of the existing program.<sup>41</sup> The minimum impact to a program is generally a loss of the most recently achieved program milestone and a requirement to seek out less costly alternatives, significantly delaying the overall program schedule.<sup>42</sup> The key question by which to evaluate the CSM is *whether it can conform to its approved funding baseline*.

### **Program Specific Obstacles**

In addition to the above criterion based upon recent programmatic decisions, there are several evaluation criteria that tend to be program or system specific. These criteria cannot be applied in any single form across the entirety of the Defense Acquisition arena, and tend to have different interpretations for different types of weapons systems. They include political preference and international opposition and risk, and fiscal challenges.

Criterion 4: Political Preference. This criterion is one that is largely dependent upon the makeup of the current Presidential administration as well as that of Congress. There are many programs that have either been forced upon the military, or have become lightning rods for opposition parties to organize against. An example of the former is the continued purchase of C-17 Globemaster III cargo aircraft, even though the Air Force does not desire additional platforms of this type. An example of the latter is the F-22 Raptor air superiority fighter, which the Department of Defense wants to cancel at the current purchase of 187 aircraft. In this case the

administration and the majority of Congressional Democrats desire to cancel the program, but many in the Republican Party desire to continue production to ensure US air superiority in the face of foreign technological advances. Even within the Prompt Global Strike family of systems, Congressional preference appears to vary by the type of platform. Congressional opposition to the desired method of employment is largely responsible for the cancellation of the Conventional Trident Missile program. The key question by which to evaluate the CSM is *whether it has or can retain the necessary Congressional support to survive in the current political climate.*

Criterion 5: International Implications. In addition to domestic political influence, the reaction of foreign governments can help to shape the acquisition of new systems. This is most apparent in strategic weapon systems, where the deployment of a new system is generally deemed a threat to the opposing countries. A recent example of this phenomenon is the unexpectedly stringent opposition by the Russian Federation to the deployment of the European portion of the Ground Based Missile Defense System. Deemed a threat to Russia's ability to use its nuclear arsenal as a deterrent, it drew threats of pre-emptive attacks against any nation support the system's deployment. Plans to emplace the system in both Poland and the Czech Republic were recently shelved largely due to the intense opposition received. Similar opposition to the Conventional Trident focused on the difficulty of differentiating it from a nuclear equivalent, exposing the United States to a potential nuclear counterattack if it employed the system. In this arena the key question by which to evaluate the CSM is *whether it can be employed in a manner that will minimize international opposition to the program.*

### **General Issues and Derived Evaluation Criteria**

Criterion 6: Fiscal Environment and Priority. Within the scope of this evaluation, this criterion is addressed in a stand-alone manner, separate from the other criteria. It should be



readily apparent, however, that the fiscal environment significantly influences those factors addressed in the previous criteria. It measures the existing and expected fiscal environment as applied to the acquisition realm, and compares the program's priority within the overall DOD acquisition portfolio. If not sufficiently prioritized, a program faces potential delays or cancellation simply due to the lack of available funding dollars. In the era of failing economies and significant budget shortfalls, not all of programs can successfully compete for funding. An example of a program having met this fate is the Air Force's Transformational Satellite Communications System (TSAT). DOD cancelled the TSAT program because it was exorbitantly costly, and replaced by two less capable but proven and less expensive satellite systems.<sup>43</sup>



## **Section 4: Analysis**

The Conventional Strike Missile is the DOD's choice fill the Prompt Global Strike capability gap, providing the President non-nuclear options to strike high value, fleeting targets when US forces are not present in the target's vicinity. The CSM is the second system chosen to fill the PGS capability gap, having succeeded the Conventional Trident Missile following Congressional direction to terminate the CTM program. Given the recent realignment of DOD acquisition priorities to support systems with a demonstrated or likely impact on the Global War on Terror, this paper evaluates the CSM against several criteria that resulted in the cancellation of other programs, including the CTM.

### **Summary of the Analysis**

An analysis of the CSM against the evaluation criteria in section 3 yields a much improved picture when compared to its predecessor, the Conventional Trident. Several of the issues that brought down the CTM program no longer exist in the CSM, but troubling concerns persist.

Within this analysis, the discussion centers on the CSM, but also includes a comparison to the CTM for completeness and to highlight the specific areas in which the CSM addresses issues that proved problematic for its predecessor. The figure below summarizes each program's performance against the selected evaluation criteria, which will be later explained in further detail.

Criterion	CTM	CSM
Criterion 1: Relevance	YES	YES*
Criterion 2: Schedule Stability	YES	YES**
Criterion 3: Funding Stability	NO	YES
Criterion 4: Political Preference	NO	YES
Criterion 5: International Implications	NO	NO
Criterion 6: Fiscal Environment and Priority	YES	YES***

Figure 4. Evaluation Criteria versus CTM and CSM

\* *Relevant in mission, not in timeline*

\*\* *Potentially stable pending result of impact of third stage defect*

\*\*\* *A high priority for DOD, facing a challenging fiscal environment*

#### CSM Performance Against the Criteria

The first criterion, *relevance*, yields an interesting result in the analysis as the CSM's predecessor, the CTM, actually rates better than the current system. Where the CTM is relevant in both its stated mission and the timeline for fielding the first systems, the CSM only makes the cut with regard to mission relevance. Both systems have as major objectives the neutralization of fleeting high value targets, but only the CTM could be deployed before 2012. The CSM's current deployment schedule for initial capability is currently planned for 2015 at the earliest; this puts its relevance against the current GWOT conflicts as questionable considering that Operation Enduring Freedom commenced in 2001. Given that the American public's tolerance for extended conflict with increasing casualties is low as demonstrated in both Vietnam and more recently Iraq<sup>44</sup>, it is not likely that the US will still be substantially engaged in Afghanistan or Pakistan in 2015, 14 years after OEF began.

The second criterion, *schedule stability*, is another area in which the CTM outperforms the CSM. Navy efforts to field the CTM proceeded apace while funding remained available, and some program related efforts continue even after Congress cancelled the Trident effort. The CSM has not conformed to its originally proposed schedule, incurring a delay in the expected full system flight test from 2010 to 2012 due to an early funding shift in the baseline program.<sup>45</sup> The first flights of the Hypersonic Test Vehicle (HTV) 2a and 2b vehicles, which will evolve into the final hypersonic payload for the deployed CSM system, remain on schedule for Dec 2009 and May 2010 respectively.<sup>46</sup> As of this writing, however, the first launch of the Minotaur IV launch vehicle is indefinitely on-hold pending resolution of an undisclosed technical problem on the booster's third stage.<sup>47</sup> If not resolved or validated as a non-player before the Dec 09 launch, the HTV-2 launches which will utilize the Minotaur IV booster could be negatively affected.

The next criterion, *funding stability*, is an area where the CSM excels in comparison to its predecessor. The CSM program has steadfastly held to its approved funding levels, a sign of efficient program execution. In addition, the CSM has not received significant cuts within the normal budget cycle<sup>48</sup>, preventing the need for program restructuring and the inevitable cost increases and schedule delays that follow.

Political preference, the fourth criterion of this evaluation, is another area where the CSM excels. Lacking the more controversial employment method of the CTM, the Conventional Strike Missile lacks a lightning rod around which to polarize domestic opposition. While there is still opposition to any new ballistic weapon system, the CSM is seen as an effective compromise between the risky CTM and the need to strike targets rapidly. Additionally, the CSM is not currently a system that is desired by Congress but not the DOD, or vice-versa. For now, the

system has the necessary support across the government to continue towards its desired deployment date.

While domestic opposition is minimal, international opposition is another story. Put simply, foreign governments do not look favorably on any ballistic weapon system that can reach out and strike targets anywhere in the world with virtually no warning. While opposition is more muted than with the CTM, it does exist with the CSM program. Though it does not fly a ballistic trajectory, the CSM does start its mission as with any ballistic weapon system, and is based on a retired Peacekeeper ICBM first stage. Any country capable of detecting the launch will likely see the initial launch as an ICBM, before the weapon assumes its hypersonic attack profile. While an improvement over the CTM's fully ballistic trajectory, the nuclear ambiguity is not completely eliminated. A secondary area of opposition is the inevitable collateral damage that such a weapon will cause. Even if the CSM is armed with only a kinetic projectile to destroy by the force of impact alone, the speeds employed by the system may still inflict significant damage on the target area. Opposition to collateral damage in Afghanistan brought airstrikes to a virtual halt<sup>49</sup>; a system that is controlled from halfway around the world that cannot easily be diverted or destroyed if it misses its target will certainly draw forth significant opposition on the world stage.

Within the DOD, deploying the CSM to fill the Prompt Global Strike gap remains a high priority. As such, the program is well ranked within the overall DOD acquisition priorities. Provided that this ranking remains consistently high, the CSM will likely weather the minor cuts and funding redirects inherent to the acquisition process. In such cases, cuts against a highly ranked program like CSM result in reductions in lower ranked endeavors to make funds available to remediate the impact of the lost funding. In the current fiscal environment, however, any

major delays in the program that push the CSM's deployment further into future put that prioritization at risk. Loss of *schedule stability* would put the system's GWOT *relevance* at risk, potentially placing the CSM at risk of further delay or cancellation when compared with system that have a direct impact on the ongoing Global War on Terror.

### Analysis Summary

After evaluating the CSM against the six criteria, it is clear that the system's ability to play a role in the near term War on Terror remains unlikely. While showing clear improvements over the CTM in the areas of fiscal and domestic political stability, intense international opposition coupled with a deployment timeline outside of the likely timeframe of ongoing GWOT operations in Pakistan and Afghanistan may prevent the system's use in current conflicts. Within the existing challenging fiscal environment, the system must retain its prioritization within both the DOD and Congress or it may face termination before it can have any impact in any conflict.

## **Section 5: Future of the CSM**

### *System Utility in Ongoing Conflicts*

The Conventional Strike Missile's lack of relevance to the ongoing GWOT conflicts in Afghanistan and Pakistan will likely result in an uphill battle for funding against more relevant programs. As seen with the F-22 Raptor, even well performing weapon systems are facing termination in the current fiscal environment if a direct impact to the GWOT cannot be demonstrated. As the CSM is unlikely to reach the deployment stage prior to 2015 at best, 14 years after the start Operation Enduring Freedom, the only likely GWOT impact will be in an as yet undefined theater of operations. While proponents of the program will argue that the system is also designed to strike emerging nuclear threats in areas such as North Korea and Iran, similar types of arguments did not save the F-22.

### *Long Term Prospects*

Should the CSM reach deployment on schedule, it will enable a new set of options in dealing with high value fleeting targets. At a minimum it will force adversaries to take additional steps to prevent their own vulnerability to a rapid strike weapon, putting them effectively on the defensive and reducing their ability to gather together and plan attacks against US forces and assets. Additionally, the CSM will represent the first deployed system to fill the Prompt Global Strike capability gap. Other, more exotic systems are on the drawing board, including enhanced variants of the CSM, hypersonic cruise missiles, and even an orbital delivery system to deploy US Marines rapidly to a target area known as the Small Unit Space Transport and Insertion (SUSTAIN).<sup>50</sup> While these systems would certainly enhance the US capability to rapidly react to developing situations around the world, they are unlikely to see deployment unless the CSM or another lower technology system is first proven.

*Conclusion: To CSM or not to CSM*

In the search for a credible Prompt Global Strike capability, the Conventional Strike Missile represents a viable replacement for the cancelled Conventional Trident Missile. When compared side by side, the CSM lacks several of the key problem areas that doomed the CTM to the termination, including funding stability and domestic political preference. In the current fiscal environment, however, the CSM's remaining problem areas of international opposition and availability for use in the ongoing and near-term GWOT engagements in Afghanistan and Pakistan put the program at risk for cancellation or delay should the current administration seek additional cuts in future defense budgets. Though the CSM is unlikely to impact the ongoing GWOT conflicts in Afghanistan and Pakistan, it is important for the DOD to continue pursuing deployment of the weapon system. The CSM will provide the Commander-in-Chief with the capability to strike fleeting high value targets when other conventional forces are unavailable, ensuring that the only answer is not a nuclear option.



## Glossary

AOR	Area of responsibility
ATO	Air Tasking Order
CIA	Central Intelligence Agency
CONOPS	Concept of Operations
CONUS	Continental United States
CSM	Conventional Strike Missile
CTM	Conventional Trident Missile
DOD	Department of Defense
F2T2EA	Find, Fix, Track, Target, Engage, Assess
FALCON	Force Application Launch from CONUS
ICBM	Intercontinental Ballistic Missile
OIF	Operation Iraqi Freedom
OEF	Operation Enduring Freedom
OAF	Operation Allied Force
PGS	Prompt Global Strike
SCUD	NATO reporting name for the SS-1 surface to surface missile (Russian designation R-17 Elbrus or 9K72)
TEL	Transporter-erector launcher
TST	Time Sensitive Target

## Endnotes

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- <sup>1</sup> JP 3-60, *Targeting*, II-18.
- <sup>2</sup> National Academy of Sciences, *U.S. Conventional Prompt Global Strike*, 31.
- <sup>3</sup> Cohen, *Stealth*, 2005.
- <sup>4</sup> Defense Science Board, *Time Critical Conventional Strike*, 2009.
- <sup>5</sup> AFSPC, *CSM Enabling Concept*, 4.
- <sup>6</sup> Mecham, *Launch of First SBSS Satellite Delayed*, online.
- <sup>7</sup> Stewart, *U.S. should be out of Iraq by 2011*, online.
- <sup>8</sup> By direction of President Barack Obama, the current administration prefers the use of 'Overseas Contingency Operations' in place of the 'Global War on Terror' or 'Long War' (Wilson, 25 March 09, online). For consistency and to prevent confusion, this paper will use GWOT terminology throughout.
- <sup>9</sup> While ostensibly part of the ongoing GWOT, potential use of CSM in Iraq is not being examined in this paper given public statements on the current general timeframe for the withdrawal of American forces from Iraq and the anticipated time of the first flight test of the CSM weapon system. According to President Obama, all US combat troops will withdraw from Iraq by August of 2010, leaving only advisors who themselves will be withdrawn by the end of 2011 (Robinson, 2009, n/a). In contrast, the first fully integrated (booster and hypersonic payload) flight test is currently scheduled for 2012 (AFSPC, 2009, 12). Therefore, the merits of using CSM in Iraq will be treated as beyond the scope of this paper.
- <sup>10</sup> Fyfe, *Evolution of Time Sensitive Targeting*, 5.
- <sup>11</sup> Cohen, *National Commission on Terrorist Attacks*, online.
- <sup>12</sup> DefenseLink, *Operation Desert Fox*, online.
- <sup>13</sup> Fyfe, *Evolution of Time Sensitive Targeting*, 6.
- <sup>14</sup> Ibid, 12.
- <sup>15</sup> Ibid, 17.
- <sup>16</sup> Axe, *The Tech That Took Out Zarqawi*, online.
- <sup>17</sup> Gordon, *Cobra II*, 194.
- <sup>18</sup> Ibid, 195.

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- <sup>19</sup> Kristensen, *Global Strike*, 147-153.
- <sup>20</sup> Thieret, *Air Force 2025*, 28.
- <sup>21</sup> Kristensen, *Global Strike*, 150.
- <sup>22</sup> Ibid, 149.
- <sup>23</sup> DARPA, *FALCON Proposer Information Pamphlet*, 1.
- <sup>24</sup> Global Security.Org, *Conventional Trident Modification*, online.
- <sup>25</sup> National Academy of Sciences, *U.S. Conventional Prompt Global Strike: Issues for 2008 and Beyond*, 70.
- <sup>26</sup> Woolf, *Conventional Warheads*, 10.
- <sup>27</sup> US Navy, *Weapons*, online.
- <sup>28</sup> Rosenberg, *Experts Warn of Accidental Atomic War*, online.
- <sup>29</sup> Department of Defense, *Exhibit R-2: RDT&E Budget Item Justification*, 1.
- <sup>30</sup> Grossman, *Strategic Arms Funds Tilt Conventional in 2009*, online.
- <sup>31</sup> AFSPC, *CSM Enabling Concept*, 7.
- <sup>32</sup> Ryan, *Family of Joint Future Concepts*, 7.
- <sup>33</sup> AFSPC, *CSM Enabling Concept*, 11.
- <sup>34</sup> Kazmar, *Airbreathing Hypersonic Propulsion at Pratt and Whitney*, 2.
- <sup>35</sup> AFSPC, *CSM White Paper*, 3.
- <sup>36</sup> Ibid, 3.
- <sup>37</sup> Axe, *Strike Anywhere Missile*, online.
- <sup>38</sup> AFSPC, *CSM Enabling Concept*, 13.
- <sup>39</sup> Center for American Progress, *Fact Sheet on 2010 Defense Budget*, 2.
- <sup>40</sup> Carlstrom, *2010 DoD Budget Includes Requested Cuts*, online.

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- <sup>41</sup> Defense Link, *Nunn-McCurdy Cost Breaches*, 1.
- <sup>42</sup> U.S. House of Representatives, *Title 10 Section 2433*, n/a.
- <sup>43</sup> Gillmore, *Fewer Exquisite Acquisition Programs*, online.
- <sup>44</sup> CNN, *Opposition to Iraq war at all time high*, online.
- <sup>45</sup> AFSPC, *Air Force Conventional Prompt Global Strike*, 2009.
- <sup>46</sup> Ibid.
- <sup>47</sup> Clark, *Space Tracking Satellite Launch Delayed Indefinitely*, online.
- <sup>48</sup> Baum, Interview, 2009
- <sup>49</sup> Filkins, *U.S. Tightens Airstrike Policy in Afghanistan*, online.
- <sup>50</sup> United States Marine Corps, *SUSTAIN Concept of Operations*, 2008.



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